

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. **(currently amended)** A decision feedback equalizer in a terrestrial digital broadcasting receiver, comprising:

a channel estimating unit for estimating a channel of a symbol-based receiving signal based on the receiving signal and a training sequence;

a channel-matched filtering unit for changing a channel property of the receiving signal by maximizing a signal-to-noise ratio (SNR) of the estimated channel;

an input signal storing unit for storing a receiving symbol of which channel property is changed by the channel-matched filtering unit;

a channel equalizing unit for performing a decision feedback equalization by repeatedly filtering the receiving signal which passed through the channel-matched filtering unit;

a trellis decoding unit for detecting a symbol, which is decision data, based on trellis decoding algorithm with decreased complexity, whose trace back depth is 1, from channel equalized receiving symbols, and outputting the symbol in a decision directed mode;

a statistical data calculating unit for calculating statistical error data used in a blind mode and outputting the statistical error data;

a training sequence storing unit for storing the training sequence;

a switching unit for selecting a mode among the training mode, the decision directed mode and the blind mode;

an error signal calculating [[means]] unit coupled downstream of the switching unit for calculating an error signal by comparing an output signal in the mode selected by the switching [[means]] unit to an output signal of the channel equalizing [[means]] unit; and

a tap coefficient updating [[means]] unit comprising

a first input coupled to an output of the error signal calculating unit,

a second input coupled to an output of the trellis decoding unit,

a third input coupled to an output of the input signal storing unit, and

an output coupled to the channel equalizing unit for updating a tap coefficient ~~to be provided to the channel matched equalizing means~~ based on the error signal received from the error signal calculating unit, the output signal of the trellis decoding [[means]] unit, and the output signal of the input signal storing [[means]] unit, and for providing the updated tap coefficient to the channel equalizing unit.

2. **(currently amended)** The decision feedback equalizer as recited in claim 1, wherein the tap coefficient updating [[means]] unit includes:

a feed forward filter (FFF) tap coefficient updating [[means]] unit for updating a tap coefficient to be provided to a FFF of the channel equalizing [[means]] unit based on the output signal of the input signal storing [[means]] unit and the error signal;

and a feed back filter (FBF) tap coefficient updating [[means]] unit for updating a tap coefficient to be provided to a FBF of the channel equalizing [[means]] unit based on the error signal and the output signal of the trellis decoding [[means]] unit.

3. **(currently amended)** The decision feedback equalizer as recited in claim 1, wherein the channel estimating [[means]] unit estimates the channel of the symbol-based receiving signal based on the training sequence and the receiving signal for each L field or for a first field,

wherein 1 field includes 313 segments and L is larger than 1, generates the channel-matched filtering [[means]] unit in order to maximize the SNR of the estimated channel and passes the receiving signal through the channel-matched filtering [[means]] unit, and thereby the channel property of the receiving signal becomes mild.

4. **(currently amended)** The decision feedback equalizer as recited in claim 1, wherein the trellis decoding [[means]] unit detects a symbol based on a modified viterbi algorithm whose TBD is 1 and having the decreased complexity in American Advanced Television Systems Committee (ATSC) 8-vestigial sideband (8-VSB) transmission system using twelve trellis encoders, which are TCM decoders, based on a trellis code interleaver and thereby a decoding delay becomes 0.

5. **(currently amended)** A decision feedback equalizer in a terrestrial digital broadcasting receiver, comprising:

a channel estimating unit for estimating a channel of a symbol-based receiving signal based on the receiving signal and a training sequence;

a channel-matched filtering unit for changing a channel property of the receiving signal by maximizing a signal-to-noise ratio (SNR) of the estimated channel;

an input signal storing unit for storing a receiving symbol of which channel property is changed by the channel-matched filtering unit;

a channel equalizing unit for performing a decision feedback equalization by-repeatedly filtering the receiving signal which passed through the channel-matched filtering unit;

a trellis decoding unit for detecting a symbol, which is decision data, based on trellis decoding algorithm with decreased complexity, whose trace back depth is 1, from channel equalized receiving symbols, and outputting the symbol in a decision directed mode;

a statistical data calculating unit for calculating statistical error data used in a blind mode and outputting the statistical error data;

a training sequence storing unit for storing the training sequence;

a switching unit for selecting a mode among the training mode, the decision directed mode and the blind mode;

an error signal calculating unit for calculating an error signal by comparing an output signal in the mode selected by the switching unit to an output signal of the channel equalizing unit; and

a tap coefficient updating unit for updating a tap coefficient to be provided to the channel equalizing unit based on the error signal, the output signal of the trellis decoding unit and the output signal of the input signal storing unit;

~~The decision feedback equalizer as recited in claim 1, wherein a symbol detecting process of the trellis decoding unit comprises a symbol detector configured to perform a symbol detecting process of~~ includes:

a) calculating an absolute distance pair including two absolute distances between symbol pairs in an input signal of ~~[[a]]~~ the symbol detector and a trellis diagram;

b) selecting an absolute distance having a small value for each absolute distance pair among absolute distance pairs;

c) calculating an accumulated absolute distance by adding a previous absolute distance to a current calculated absolute distance for each state in the trellis diagram in a time index;

d) deleting the accumulated absolute distances except the smallest accumulated distance for each state in the trellis diagram in the time index;

e) selecting a state in which the accumulated absolute distance is smallest among all states shown in the trellis diagram in the time index and obtaining an output signal of the symbol detector; ~~which is the trellis decoding means;~~ from a branch shown in the trellis diagram transited to the selected state; and

f) repeatedly performing the steps a) to e) for each symbol time index.

6. **(currently amended)** A decision feedback equalizing method in a terrestrial digital broadcasting receiver, said method comprising the steps of:

a) estimating a channel of a symbol-based receiving signal based on a receiving signal and a training sequence;

b) changing a channel property of the receiving signal in order to maximize a signal-to-noise ratio (SNR) of the estimated channel by passing the receiving signal through a channel-matched filter;

c) determining a parameter used for a decision feedback of the receiving symbol whose channel property is changed, and initializing a channel equalization parameter;

d) detecting a symbol from an output signal of an equalizer in a specific time index signal according to the determined parameter based on a trellis decoder which has a whose trace back depth (TBD) of 1 ~~and is 1 and having~~ decreased complexity;

e) calculating statistical error data used in a blind mode;

f) selecting one mode among a training mode, a decision mode and the blind mode;

g) calculating an error signal by comparing an output signal of the mode selected in the step f) to ~~[[an]] the output signal of a channel the equalizer~~, and updating a tap coefficient of a filtering block of the equalizer based on the error signal, the output signal of the equalizer and the receiving signal passed through the channel-matched filter; and

h) performing a decision feedback equalization in which the filtering block of the equalizer filters the receiving signal passed through the channel-matched filter based on the updated tap coefficient of said filtering block.

7. **(currently amended)** The decision feedback equalizing method as recited in claim 6, wherein ~~[[the]]~~ a channel estimator estimates the symbol-based receiving signal based on the training sequence and the receiving signal for each L field, or for a first field, wherein 1 field includes 313 segments and L is larger than 1, generates the channel-matched filter in order to maximize the SNR of the estimated channel and passing the receiving signal through the channel-matched filter, and thereby the channel property of the receiving signal becomes mild.

8. **(currently amended)** The decision feedback equalizing method as recited in claim 6, wherein the trellis decoder detects a symbol based on a modified viterbi algorithm with decreased complexity, whose TBD is 1, in American Advanced Television Systems Committee (ATSC) 8-vestigial sideband (8-VSB) transmission system using twelve trellis encoders, which are Trellis-coded modulation (TCM) decoders, based on a trellis code interleaver and thereby a decoding delay becomes 0.

9. **(currently amended)** The decision feedback equalizing method as recited in claim [[8]] 6, wherein [[the]] a channel estimator estimates the channel of the receiving signal based on the receiving signal and the training sequence, generates the channel-matched filter based on information of the estimated channel, equalizes the receiving signal passed through the channel-matched filter by using the ~~decision feedback~~ equalizer having the viterbi trellis decoder, which is based on the modified viterbi algorithm and has with decreased complexity, whose and TBD [[is]] of 1, and thereby the ~~decision feedback channel~~ equalization is performed effectively under an inferior environment such as in a room or in mobile.

10. **(currently amended)** A symbol detecting method for channel equalization in a terrestrial digital broadcasting receiver, the method comprising the steps of:

- a) calculating an absolute distance pair including two absolute distances between symbol pairs in an input signal of a symbol detector and a trellis diagram;
- b) selecting an absolute distance having a small value for each absolute distance pair among absolute distance pairs;
- c) calculating an accumulated absolute distance by adding a previous absolute distance to a current calculated absolute distance for each state in the trellis diagram in a time index;
- d) deleting the accumulated absolute distances except the smallest accumulated distance for each state in the trellis diagram in the time index;
- e) selecting a state in which the accumulated absolute distance is smallest among all states

shown in the trellis diagram in the time index and obtaining an output signal of the symbol detector; ~~which is the trellis decoding means~~, from a branch shown in the trellis diagram transited to the selected state; and f)

repeatedly performing the steps a) to e) for each symbol time index.

11. **(new)** A computer-readable medium containing therein computer-executable instructions which, when executed by a computer, cause the computer to perform the method of claim 9.

12. **(new)** A computer-readable medium containing therein computer-executable instructions which, when executed by a computer, cause the computer to perform the method of claim 10.